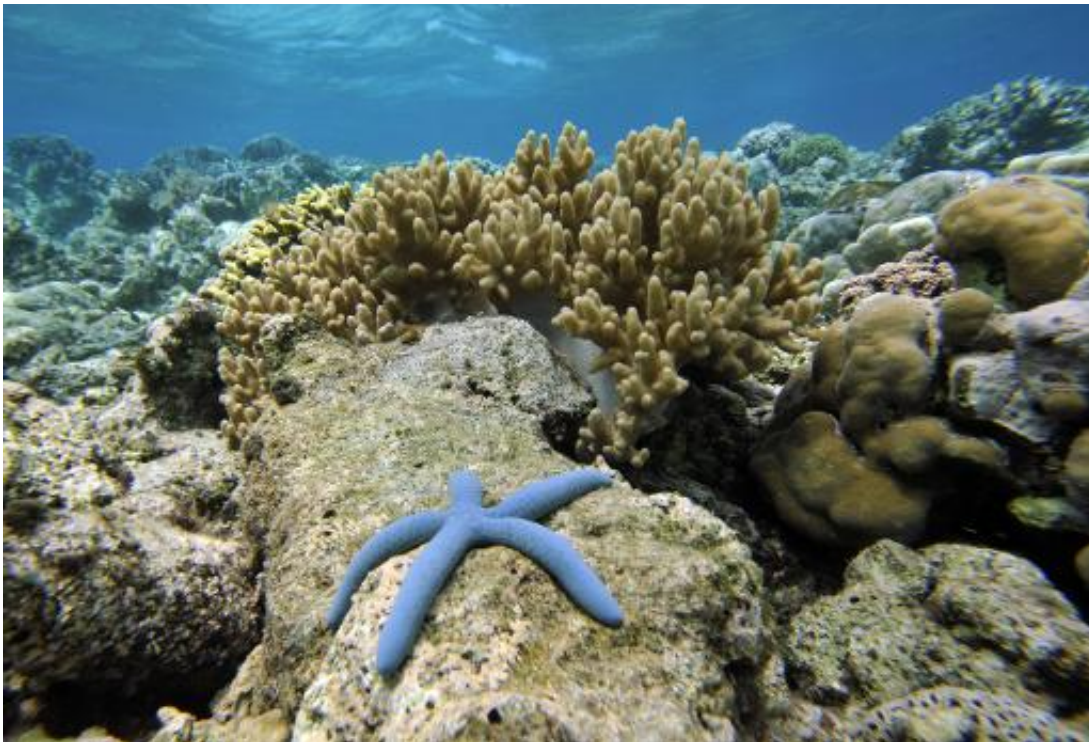


Seas face biodiversity shakeup even under 2 C warming

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Severe warming—on current trends, Earth is on track for up to 4.8 C this century alone—would cause the biggest ocean species change in the last three million years

The oceans will undergo a dramatic turnover in biodiversity even if the UN meets its goal of limiting of global warming to two degrees Celsius (3.6 degrees Fahrenheit), scientists said Monday.

Species that need cooler waters will migrate or become extinct, to be replaced by ones that can survive in warmer seas—with major consequences for fisheries.

"If [climate change](#) is not tackled quickly, it will lead to a massive reorganisation of [marine biodiversity](#) on a planet-wide scale," said France's National Centre for Scientific Research (CNRS), whose scientists took part in the investigation.

The study, published in the journal *Nature Climate Change*, first examined biodiversity changes in three eras of Earth's history.

The first was the mid-Pliocene, a warm period which ended about three million years ago.

The second was a much colder time—the peak of the last Ice Age, also called the Last Glacial Maximum, from about 26,500 to 20,000 years ago.

The third was from 1960 to 2013, when man-made [global warming](#) cranked into high gear.

The scientists then compared these patterns to warming projections for 2100, which vary according to greenhouse gas emission levels.

Under the most optimistic forecast, assuming average warming of about 1 C, there would be only minor changes in biodiversity by 2100, the team found.

Severe warming—on current trends, Earth is on track for up to 4.8 C this century alone—would cause the biggest ocean species change in the last three million years.

Worryingly, even if UN members meet the 2 C goal, biodiversity shift by 2100 would be triple that of the last half-century, the team said.

The study, headed by Gregory Beaugrand of the University of Science and Technology in Lille, northern France, focused on species in the upper 200 metres (650 feet) of the ocean, the most valuable part of the ecosystem for humans.

Part of the work is based on theorised species change, as actual knowledge of ocean biodiversity and species behaviour is in many cases limited.

In addition, there are many gaps in understanding how warming will affect a vast, complex body like the ocean.

Even so, the results leave no doubt that the bigger the warming, the greater the [biodiversity](#) shift, the scientists said.

The change will be greater in waters that today are cold or temperate—new species will expand into these regions but "this will not compensate global [species](#) extinction," the study warned.

More information: *Nature Climate Change*, [DOI: 10.1038/nclimate2650](#)

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